



Marine Personnel Carrier (MPC)



The Marine Corps has reaffirmed a requirement for a new Marine Personnel Carrier (MPC), an advanced generation eight-wheeled armored personnel carrier that would provide general support lift to Marine infantry in the ground combat element based maneuver task force. The MPC requirement is shaped to provide a balance of performance, protection and payload in order to set the conditions for fielding a combat vehicle that will be effective across the range of military operations.

The MPC family of vehicles will consist of a base vehicle and two supporting mission role variants. The MPC-Personnel will be the base vehicle, two of which carry and support a reinforced rifle squad of 17 Marines (one ACV would do the same). Each vehicle would carry 9 combat-equipped Marines and a three-man crew. This meets the need to transport more Marine infantrymen than the existing Light Armored Vehicle (LAV) or HMMWV platforms while providing greater protection. The eight-wheeled LAV is not employed as an armored personnel carrier and usually carries a four-person Marine scout/reconnaissance team in addition to its crew. The MPC-Command will be equipped to serve as a mobile command-echelon/ fire-support coordination center for the infantry battalion headquarters. The MPC-Recovery will be the maintenance and recovery variant of the MPC.

An MPC company lifts an infantry battalion in conjunction with the infantry's organic wheeled assets. Like the planned ACV, MPCs will be assigned to the Assault Amphibian Battalions of the Marine Division currently outfitted with AAVs. The reconstituted Assault Amphibian battalion would tentatively consist of one MPC company (nominally 88 vehicles) and three ACV companies (about 45 vehicles each).

The MPC supports expeditionary maneuver by enhancing the Marine Air Ground Task Force's (MAGTF) tactical and operational protected mobility. Conceptually, the MPC will complement the ACV and will be delivered to the fight as part of the reinforcing echelon of the MAGTF during forcible entry operations and in of support sustained operations ashore. The MPC will enable the GCE to maintain lift capacity requirements and provides an additional balanced platform that will be capable across the range of military operations.

The Marine Corps leadership deferred a Milestone A go-ahead for the MPC program in May 2008.

MPCs would also be supported by JLTVs carrying heavy weapons, communications equipment, and cargo.

The MPC will be designed to cross rivers and inland bodies of water in a Marine Air-Ground Task Force's littoral operational area. The MPC likely would have a remotely operated weapon station turret fitted with a .50 caliber machine gun, a 7.62 mm machine gun, or an automated Mk. 19 grenade launcher with a thermal sight. The MPC crew could provide direct fire in support of dismounted Marine infantrymen.

The program has built an MPC Technology Demonstrator test bed vehicle at the Nevada Automotive Test Center, Carson City, Nev., which is being used to evaluate all required performance attributes, including mobility (powerpack, drive train, and suspension system), survivability, electrical power generation and distribution, vehicle health monitoring, and the communication system.

A Capabilities Development Document (CDD) for the program is in development. The MPC test bed vehicle effort will inform the CDD with respect to achievable operational performance requirements and inform the program office of potential integration risks.

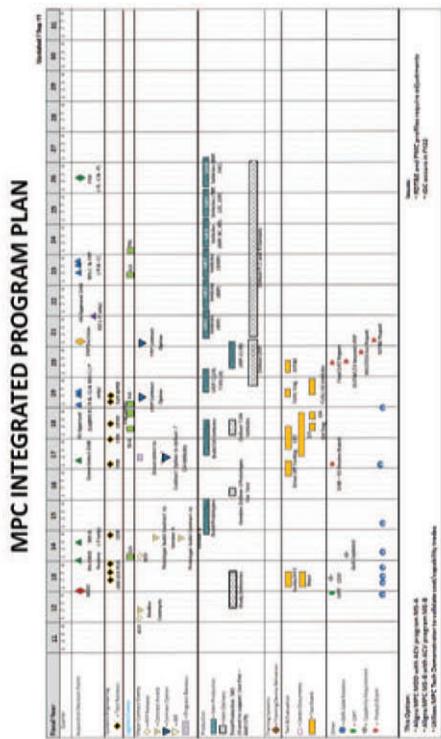
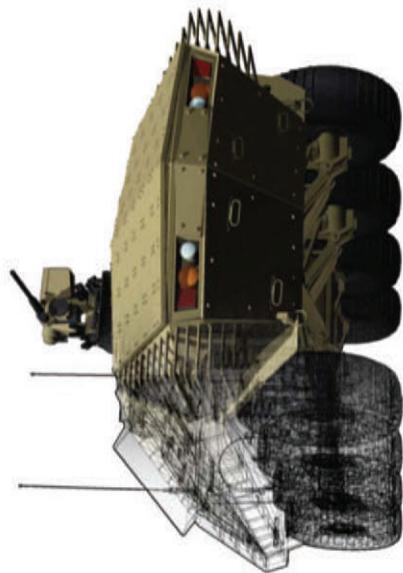
The MPC may be a pilot program for cooperation between the Marine Corps and the Army's Tank Automotive Research and Development Engineering Center in Warren, Mich., as part of the program's risk-reduction efforts before it becomes a formal acquisition program.

In May 2011, The MPC program was transferred out from under the formerly chartered authority of Program Manager, Light Armored Vehicles (PM LAV), TACOM Life Cycle Management Command, Warren, Michigan, to, Program Manager, Advanced Amphibious Assault (PM AAA), Woodbridge, Virginia. The MPC will continue to remain under the PEO oversight of PEO Land Systems, in Quantico, Virginia.



Marine Personnel Carrier (MPC)

Resource Sponsor: CD&I



Program Description

- The MPC will provide four battalions of armored personnel carrier-based, general support lift to the GCE of the MAGTF
- The MPC will be effective across the range of military operations during sustained operations ashore and reinforce the ACV-equipped assault echelon during forcible entry operations
- An MPC Company is designed to lift an infantry battalion in conjunction with the infantry's organic wheeled assets
- MPC will field a base vehicle (MPC-Personnel) and two supporting mission role variants: MPC-Command and Control (MPC-C) and MPC-Recovery (MPC-R)

Program Status

- The MPC program is pre-Milestone A.



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MPC's Top Three Program Technology Issues:

- 1. Survivability** - The space, weight, and power required to protect the vehicle occupants will challenge the vehicle performance requirements. We need lightweight survivability solutions with specific focus on blast and direct fire protection
- 2. Weight** - Meeting the weight target for MPC will be difficult given the survivability requirements, volume for buoyancy, and troop/equipment capacity. Light weight solutions for vehicle materials and components are needed.
- 3. On-Board and Exportable Power** - Internal power demands as currently defined for the MPC exceeds the ability of the MPC to export power when the vehicle is stationary. There is a need to incorporate power generation, management and distribution technologies to enable adequate power distribution to include on and off vehicle applications including silent watch capability.

1. Survivability:

1a. No Active S&T Initiatives for MPC

1b. Potential S&T Initiatives for MPC

Discovery and Innovation (D&I)

- Lightweight Armor Materials
- Energy Absorbing Structures for Blast Mitigation
- CSTV Shock Mitigating Seats

Exploration & Development (E&D)

- CSTV Shock Mitigating Seats

Small Business Technology Transfer and Research (STTR)

- Mitigation of Fuel Tank Explosions and Fires (MTVR STTR Phase I)

TARDEC

- Advanced Combat Vehicle Armor Development (ACVAD)

Other

- AMAS JCTD
- Fuel Tank Protection System Swampworks
- MTVR Blast Seat Evals

2. Weight:

2a. No Active S&T Initiatives for MPC

2b. Potential S&T Initiatives for MPC

Exploration & Development (E&D)

- Lightweight Armor Materials
- Expeditionary Light Armor Seeding Development

Discovery and Innovation (D&I)

- Energy Storage Module to Reduce Fuel Consumption

Small Business Innovation Research (SBIR)

- Aluminum Casting Alloy (ACV SBIR II)
- Modular Lightweight Armor System (ACV SBIR II)
- Modular Lightweight External Fuel Tank System (ACV SBIR I)

Small Business Technology Transfer and Research (STTR)

- Low Cost, Low Weight, Self-Sealing Fuel Tank Technology Development (ACV STTR II)

TARDEC

- Advanced Combat Vehicle Armor Development (ACVAD)

Other

- JLTV Phase 'A' Light Weight Armor Study

3. On-Board and Exportable Power:

3a. Active S&T Initiatives for MPC

- Phase 'A' Power Distribution & Management Study

3b. Potential S&T Initiatives for MPC

Exploration & Development (E&D)

- Vehicle Integrated Power and Propulsion

Future Naval Capability (FNC)

- Fuel Efficient MTVR

TARDEC

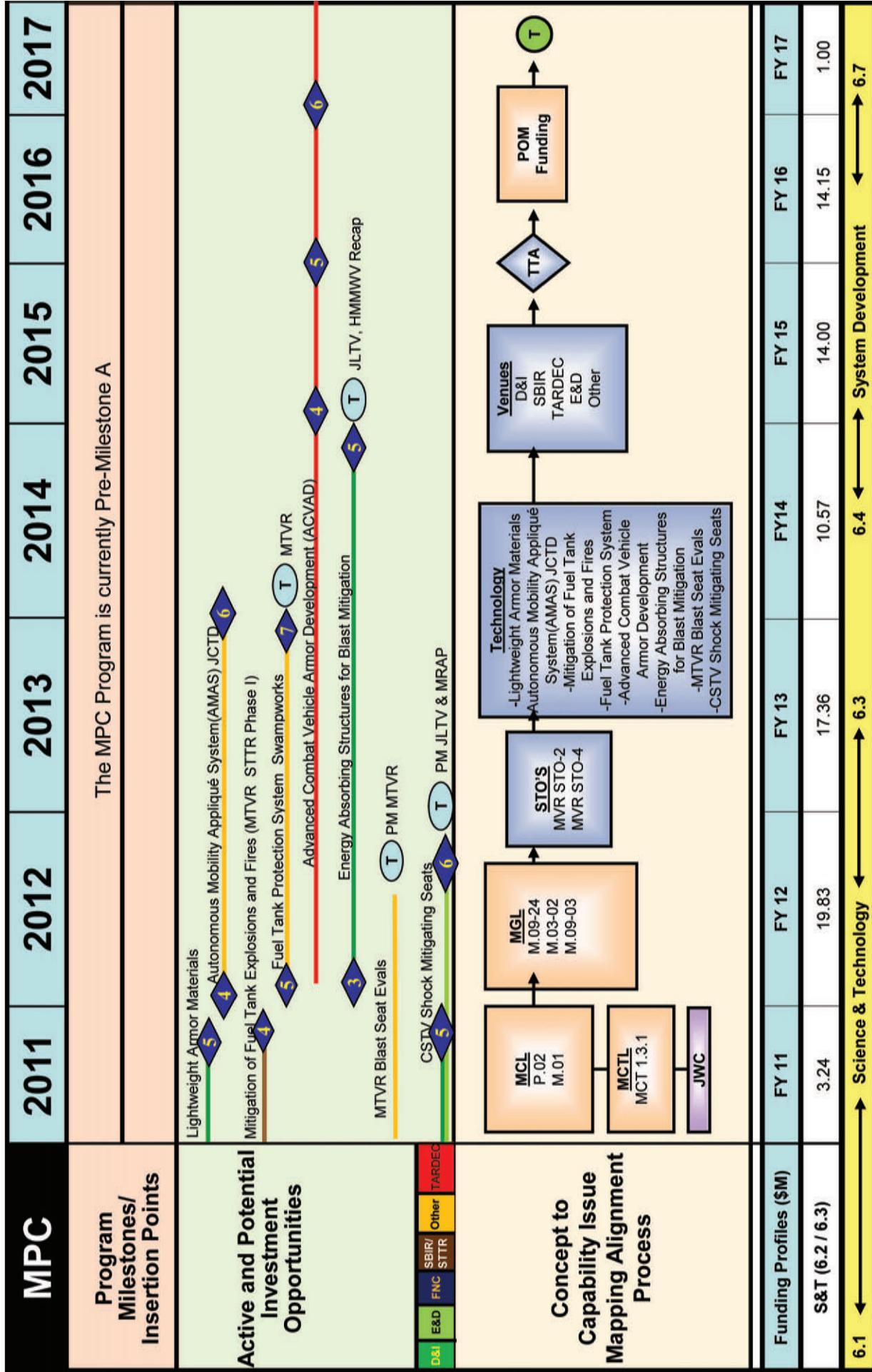
- Ground Vehicle APU System Development *JP-8 Fuel Cell System
- Ground Vehicle APU System Development * High Power Density Common APU
- Energy Storage Research & Development

Other

- On-Board Vehicle Power Systems Development



MPC Technical Issue #1 Survivability





MPC Technical Issue #1 Survivability

MCL	P.02 Protect personnel, physical assets and LOCs M.01 Maneuver to secure
MCTL	MCT 1.3.1 Conduct Maneuver
MGL	M.09-24 Force Protection M.03-02 Protected mobility M.09-03 Protect armor platforms against RPG and ATGMs
STO'S	MVR STO-2 Ground vehicle mobility MVR STO-4 Advanced materials and survivability technology to enhance the performance and survivability of combat vehicles
Technology	<p>Active: None</p> <p>Potential:</p> <ul style="list-style-type: none">-Lightweight Armor Materials-Autonomous Mobility Appliqué System(AMAS) JCTD-Mitigation of Fuel Tank Explosions and Fires-Fuel Tank Protection System-Advanced Combat Vehicle Armor Development-Energy Absorbing Structures for Blast Mitigation-MTVR Blast Seat Evals-CSTV Shock Mitigating Seats
Venues	D&I, SBIR, TARDEC, E&D, Other
	N/A
POM Funding	MCCDC Integration Division
	Transition to a program of record
	Comments/Issues:



MPC Technical Issue #2 Weight

MPC	2011	2012	2013	2014	2015	2016	2017																
Program Milestones/ Insertion Points	The MPC Program is currently Pre-Milestone A																						
Active and Potential Investment Opportunities	<p>The timeline diagram illustrates the progression of the MPC Program through four distinct phases:</p> <ul style="list-style-type: none"> Phase 1 (Green): Milestones include "Aluminum Casting Alloy (ACV SBIR II)" (point 3), "Expeditionary Light Armor Seeding Development" (point 1), and "JLTV Phase 'A' Light Weight Armor Study" (point 4). Phase 2 (Orange): Milestone is "Lightweight Armor Materials" (point 5). Phase 3 (Yellow): Milestones include "Advanced Combat Vehicle Armor Development (ACVAD)" (point 4), "Low Cost, Low Weight, Self-Sealing Fuel Tank Technology Development (ACV STTR II)" (point 6), and "Energy Storage Module to Reduce Fuel Consumption" (point 5). Phase 4 (Red): Milestone is "Modular Lightweight Armor System (ACV SBIR II)" (point 6). 																						
D&I E&D FNC SBIR/ Other STTR TARDEC																							
Concept to Capability Issue Mapping Alignment Process	<pre> graph TD MCL[MCL P.02 M.01] --> STOS[STOS MVR STO-2 MVR STO-4 MVR STO-5] MCL --> MCTL[MCTL MCT 1.3.1 MCT 1.4.1] MCTL --> JWC[JWC] STOS --> Technology[Technology] Technology --> Venues[Venues D&I E&D SBIR TARDEC] Technology --> TTA[TTA] Technology --> POM[POM Funding] TTA --> POM </pre> <p>The flowchart details the process for aligning concepts to capability issues:</p> <ol style="list-style-type: none"> MCL (Milestone 1.3.1): Contains sub-points P.02 and M.01. STOS (Milestone 2.0.0-25): Contains sub-points M.07-02 and M.09-07. MCTL (Milestone 2.0.0-26): Contains sub-points MCT 1.3.1 and MCT 1.4.1. JWC (Joint Warfighting Center): Represented by a purple box. Technology: A blue box listing various projects: <ul style="list-style-type: none"> -Aluminum Casting Alloy -Expeditionary Light Armor Seeding Development -JLTV Phase 'A' Light Weight Armor Study -Advanced Combat Vehicle Armor Development -Low Cost, Low Weight, Self-Sealing Fuel Tank Technology Development -Modular Lwt Armor System Venues: A blue box listing organizations: D&I, E&D, SBIR, TARDEC. TTA (Technology Transfer Agency): A blue diamond-shaped box. POM Funding: An orange box. 																						
Funding Profiles (\$M)	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17																
S&T (6.2 / 6.3)	3.98	9.92	7.22	9.80	14.50	14.15	1.00																
6.1	<p>The funding profile chart shows the following data:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Funding (\$M)</th> </tr> </thead> <tbody> <tr> <td>FY 11</td> <td>3.98</td> </tr> <tr> <td>FY 12</td> <td>9.92</td> </tr> <tr> <td>FY 13</td> <td>7.22</td> </tr> <tr> <td>FY 14</td> <td>9.80</td> </tr> <tr> <td>FY 15</td> <td>14.50</td> </tr> <tr> <td>FY 16</td> <td>14.15</td> </tr> <tr> <td>FY 17</td> <td>1.00</td> </tr> </tbody> </table>							Year	Funding (\$M)	FY 11	3.98	FY 12	9.92	FY 13	7.22	FY 14	9.80	FY 15	14.50	FY 16	14.15	FY 17	1.00
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<p>The overall system development timeline spans from 2011 to 2017, with major milestones marked by double-headed arrows:</p> <ul style="list-style-type: none"> 2011-2012: Initial concept and planning. 2012-2013: Early technology development and initial system integration. 2013-2014: Advanced technology insertion and system refinement. 2014-2015: Full system integration and initial operational testing. 2015-2016: Final system validation and preparation for deployment. 2016-2017: Deployment and initial operational use. 						System Development	6.7																



MPC Technical Issue #2 Weight

MCL	P.02 Protect personnel, physical assets and LOCs M.01 Maneuver to secure
MCTL	MCT 1.3.1 Conduct Maneuver MCT 1.4.1 Conduct Mobility Operations
MGL	M.09-25 Movement Standards M.07-02 Light Armored Recon
STO'S	MVR STO-2 Ground vehicle mobility MVR STO-4 Advanced materials and survivability technology to enhance the performance and survivability of combat vehicles and surface craft MVR STO-5 Vehicle and surface craft design for Marine usability, habitability, and survivability
Technology	<p>Active:</p> <ul style="list-style-type: none">-N/A <p>Potential:</p> <ul style="list-style-type: none">-Aluminum Casting Alloy-Expeditionary Light Armor Seeding Development-JLTV Phase 'A' Light Weight Armor Study-Advanced Combat Vehicle Armor Development-Lightweight Armor Materials-Energy Storage Module to Reduce Fuel Consumption-Low Cost, Low Weight, Self-Sealing Fuel Tank Technology Development-Modular Lightweight External Fuel Tank System-Modular Ltwt Armor System
Venues	D&I, E&D, SBIR, TARDEC, Other
TTA	N/A
POM Funding	MCCDC integration division
T	Transition to a program of record
	Comments/Issues:



MPC Technical Issue #3 Onboard and Exportable Power

MPC	2011	2012	2013	2014	2015	2016	2017
Program Milestones/ Insertion Points	The MPC Program is currently Pre-Milestone A						
Active and Potential Investment Opportunities	<p>Vehicle Integrated Power and Propulsion PM EPS</p> <p>Ground Vehicle APU System Development *JP-8 Fuel Cell System</p> <p>Energy Storage Research & Development</p> <p>Phase 'A' Power Distribution & Management Study T PM MPC</p>						
Concept to Capability Issue Mapping Alignment Process	<p>Fuel Efficient MTVR</p> <p>On-Board Vehicle Power Systems Dev.</p> <p>STO'S MVR STO-1 LOG STO-1</p> <p>MGL L.09-11 L.09-06 M.09-11 L.13-04</p> <p>MCL L.01 L.04</p> <p>MCTL MCT 4.4.9 MCT 4.9.5</p> <p>JWC</p>						
Funding Profiles (\$M)	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17
S&T (6.2 / 6.3)	9.31	18.64	26.94	27.48	26.17	24.75	26.98
	6.1	Science & Technology → 6.3 → System Development → 6.4 → System Development → 6.7					



MPC Technical Issue #3 Onboard and Exportable Power

MCL	L.01 Provide supply support L.04 Provide logistics services
MCTL	MCT 4.4.9 Conduct Tactical Electrical Supply MCT 4.9.5 Supply Electrical Power
MGL	L.09-11 Alternate Power Sources L.09-06 On Move Power Generation M.09-11 Exportable Power For On-Board Systems L.13-04 Power generation/ distribution
STO'S	MVR STO-1 Fuel efficient and power generating vehicle systems LOG STO-1 Asset versatility
Technology	<p>Potential:</p> <ul style="list-style-type: none">-Vehicle Integrated Power and Propulsion-Ground Vehicle APU Systems Development JP-8 Fuel Cell System-Ground Vehicle APU Systems Development-Phase 'A' Power Distribution Management Study-Fuel Efficient MTVR-On-Board Vehicle Power Systems Development
Venues	E&D, TARDEC, FNC, Other
TTA	Fuel Efficient MTVR
POM Funding	MCCDC Integration Division
T	Transition target: MTVR
T	Transition to a program of record
	Comments/Issues: